

Monolithic Power Integrated Circuits for Merging Power Electronics, Management, and Distribution, Phase I

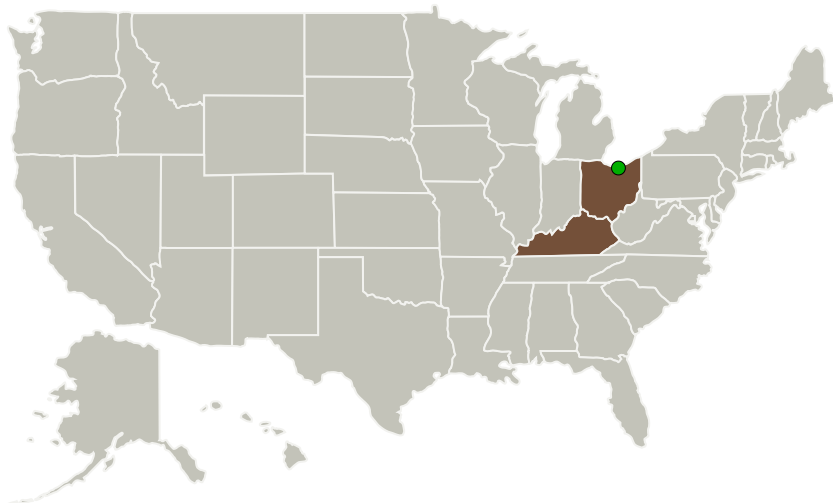
Completed Technology Project (2016 - 2016)



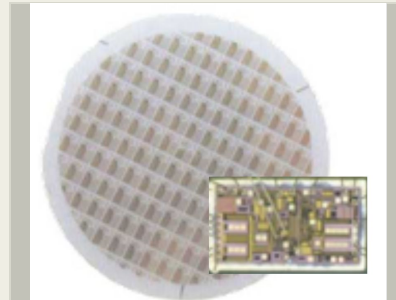
Project Introduction

APIQ Semiconductor proposes development of a scalable, wide bandgap (WBG) monolithic power integrated circuit (MPIC) technology for power electronic conversion, management, and distribution. The proposed WBG microelectronics are to be based upon low defect, homogeneous gallium nitride (GaN) based materials using native GaN substrates. The technology to be developed will replace silicon power switches and drivers in power electronics systems to yield high efficiency, high density, reliable module based systems. Inclusive in the proposal are devices for 1200 V or more power switching and digital integration. Devices will be evaluated for high temperature and heavy ion radiation hardness, with performance improvements over competing technologies expected from low materials defects and carefully managed electric field profiles.

Primary U.S. Work Locations and Key Partners



| Organizations Performing Work | Role | Type | Location |
|-------------------------------|-------------------------|-------------|----------------------|
| Apiq Semiconductor, LLC | Lead Organization | Industry | Louisville, Kentucky |
| ● Glenn Research Center(GRC) | Supporting Organization | NASA Center | Cleveland, Ohio |



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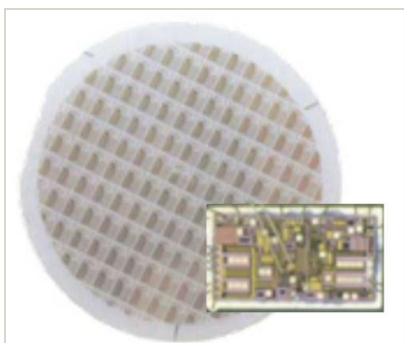


Primary U.S. Work Locations

Kentucky

Ohio

Images



Briefing Chart Image

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(<https://techport.nasa.gov/image/128270>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Apiq Semiconductor, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

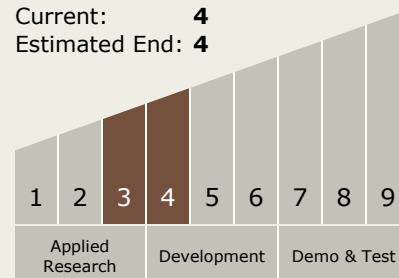
Robert Hickman

Technology Maturity (TRL)

Start: 3

Current: 4

Estimated End: 4



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.3 Power Management and Distribution
 - └ TX03.3.3 Electrical Power Conversion and Regulation

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System